



Integrating The Principle of Ukhuwah Islamiyah in Elementary Students through RME-Based Mathematics Learning on Foot Position during Congregational Prayer

Amrul Huda Fathir¹, Neni Mariana², Naif Mastoor Alsulami³

¹Elementary Teacher of Education, State University of Surabaya, East Java, Indonesia

²Elementary Teacher of Education, State University of Surabaya, East Java, Indonesia

³Curriculum and Instruction Departement, Faculty of Education, University of Jeddah, Saudi Arabia

*Correspondence: amrul.21004@mhs.unesa.ac.id

ARTICLE INFO

Received: 29 January 2024

Revised: 1 August 2024

Accepted: 14 September 2024

Published Online: 12 November 2024

Keywords:

Ukhuwah Islamiyah, RME, Congregational Prayer.

ABSTRACT

This study explores the integration of *Ukhuwah Islamiyah* (Islamic brotherhood) values into mathematics learning for elementary students through Realistic Mathematics Education (RME) using the context of foot position in congregational prayer. Employing a design research method, the study was carried out in two cycles involving small- and large-class implementations. Five learning activities were developed based on Hypothetical Learning Trajectory (HLT) and analyzed through Actual Learning Trajectory (ALT). The results revealed that learning with religious contextualization supports students' understanding of angle concepts while fostering core values of *ta'aruf* (mutual acquaintance), *tafahum* (mutual understanding), *ta'awun* (mutual cooperation), and *takaful* (mutual responsibility). The findings suggest that RME-based mathematics learning can effectively enhance both cognitive and character development, especially in promoting Islamic values of social harmony and togetherness.

How to Cite: Fathir, A.H., Mariana, N., & Alsulami, N.M. (2025). Integrating The Principle of Ukhuwah Islamiyah in Elementary Students through RME-Based Mathematics Learning on Foot Position during Congregational Prayer. *Glocal Praxis in Elementary Education*, 2(1), 21-33.

© The Author(s) 2025

Mathematics plays a very important role in solving various problems in everyday life. In line with the statement by [Permatasari, et al. \(2023\)](#) mathematics is a central science in everyday life and is introduced to humans from an early age. [Anggreni \(2019\)](#) argues that mathematics, which is an integral part of the education curriculum, is expected to contribute to achieving the main objectives of education, namely encouraging positive changes in the attitudes and behavior of students. These objectives include the formation of moral character, such as honesty, commitment, creativity, teamwork, politeness, scientific thinking, democratic attitudes, and tolerance. In addition to honing logical and systematic thinking skills, mathematics learning also has great potential in shaping individuals with integrity. Thus, mathematics is not only understood as a formal subject in school but also as an important tool that supports various aspects of life, including in practicing religious values. [Majid dan Mariana \(2024\)](#) argue that mathematics, as “The Queen of Science,” plays an important role in daily life, including in worship such as the number of rakaat in prayer and the calculation of zakat. The integration of mathematical concepts and Islamic values not only supports students' mathematical thinking abilities but also contributes to the formation of their attitudes and character. Thus, mathematics education based on Islamic values can serve as an effective medium for the development of students' personalities.

Islam is a perfect religion because it regulates various aspects of life, including worship and social relations. One of its teachings is ukhuwah, which means brotherhood. [Amin H.A, et al. \(2024\)](#) state that Ukhuwah Islamiyah is a bond of brotherhood that arises from a relationship of faith or belief, namely Islam. This means that it is the Islamic religion that unites us as brothers and sisters. Islam emphasizes that fellow Muslims are brothers and sisters, so human relationships are built on the basis of faith and concern, as stated in the hadith of the Prophet Muhammad, peace be upon him, “A person's faith is not complete until he loves his brother as he loves himself.” ([Sahih Bukhari, No. 13](#)). According to [Sopiyah, et al. \(2023\)](#), a similar concept is found in the Quran, Surah Al-Hujurat, verse 10, where Allah SWT clearly states that fellow believers are brothers, so it is obligatory for every Muslim to maintain brotherly relations based on faith.

Maintaining ukhuwah is not merely a social obligation but a command from Allah SWT that brings blessings in religious and social life. However, reality shows that Muslims, including in Indonesia, still face internal divisions. Differences in views among Islamic organizations such as NU, Muhammadiyah, and others often trigger conflicts, even influencing children's thinking. Without

a proper understanding of the principles of Islamic brotherhood, children may grow up with an exclusive mindset, viewing other groups as wrong or deviant.

This is exacerbated by cases of verbal bullying in one school environment, though not physical, but rather taunts among students reflecting a lack of understanding of brotherhood. Therefore, it is important to instill the values of Islamic Brotherhood in education so that students can appreciate differences and build harmonious relationships. If teachers can apply the principles of Islamic Brotherhood into the design of learning activities, it has the potential to minimize bullying behavior in any form. However, in practice, teachers still only provide advice and reminders periodically regarding brotherhood, without directly integrating it into the learning material. In facing this situation, an approach is needed that can teach the principles of Islamic brotherhood, namely fostering a sense of brotherhood towards fellow believers. One approach that can be used is the integration of Islamic values into mathematics learning.

There are numerous positive impacts from integrating Islamic values into mathematics education, including enhancing students' positive character, particularly in religious attitudes, improving the quality of mathematics education, increasing students' interest and motivation, and enhancing learning outcomes [Hasibuan, et al. \(2024\)](#). This integration can be done through the Realistic Mathematics Education (RME) approach. According to Fahrudin in [\(Primasari, et al. \(2021\)](#) Realistic Mathematics Education is a mathematics learning approach that stems from Freudenthal's idea that mathematics is a human activity and must be linked to real contexts in everyday life. Involving students in contextual experiences can increase their interest in learning mathematics. This is in line with what [Safitri dan Arlis \(2023\)](#) stated, that realistic mathematics learning can foster curiosity, learning motivation, and help students build ideas and understand mathematical concepts more deeply. [Gravemeijer \(1994\)](#) mentions three main principles in realistic mathematics learning, namely guided reinvention/progressive mathematizing, didactical phenomenology, and self-developed models. This approach aims to ensure that students do not merely receive information or use existing formulas but truly understand how mathematical concepts are formed. As a result, they will have a deeper understanding and be able to apply mathematics to solve various real-life problems [\(Ramadhanty, et al. \(2024\)](#).

The act of praying in congregation demonstrates the principle of Islamic brotherhood. The Prophet, peace and blessings be upon him, would place his hand on our shoulders before prayer and say, *"Keep straight, don't be irregular, for there would be dissension in your hearts. Let those of you who are sedate and prudent be near me, then those who are next to them, then those who*

are next to them.” ([Sahih Muslim, No. 654](#)). From the Companion Abdullah ibn Umar, may Allah be pleased with him, he said: The Messenger of Allah, peace and blessings be upon him, said, “*Set the rows in order, stand shoulder to shoulder, close the gaps, be pliant in the hands of your brethren, and do not leave openings for the devil. If anyone joins up a row, Allah will join him up, but if anyone breaks a row, Allah will cut him off.*” ([Sahih Abu Dawud, No. 666](#)). In another hadith, it is also said, “*Stand close together in your rows, bring them near one another, and stand neck to neck, for by Him in Whose hand my soul is, I see the devil coming in through openings in the row just like a small black sheep.*” ([Sahih Abu Dawud No. 667](#)). This can serve as a foundation for understanding that congregational prayer is not merely a physical act of worship but also a symbol of the unity of Muslim hearts in a single, aligned row, which constitutes the perfection of congregational prayer according to the positions taught by the Prophet Muhammad, peace be upon him, thereby aligning with the principle of Islamic brotherhood.

Based on the discussion presented, the researcher intends to conduct a study titled “Integrating The Principle of Ukhuwah Islamiyah in Elementary Students through RME-Based Mathematics Learning on Foot Position during Congregational Prayer”. However, current learning practices often treat Islamic values as separate from core subjects like mathematics. This separation reduces the opportunity for students to reflect on religious values in meaningful contexts. Therefore, this study seeks to bridge that gap by integrating Islamic values, particularly the principle of *Ukhuwah Islamiyah*, into mathematics learning using Realistic Mathematics Education (RME). The aim is to explore how mathematical concepts specifically angles can be contextualized in the foot position during congregational prayer to strengthen students’ understanding of brotherhood and religious social values.

METHODS

This study, titled “The Principle of Ukhuwah Islamiyah (Islamic Brotherhood) among Elementary School Students in RME-Based Mathematics Learning in the Position of Praying in Congregation,” is a qualitative study using a design research approach. According to [Van den Akker dkk. \(2013\)](#), Design Research is a systematic approach in the field of education aimed at developing learning solutions through the processes of analysis, design, and evaluation, while exploring how such interventions function in real-world contexts. According to [Gravemeijer and Cobb \(2006\)](#) the Design Research method is carried out through three stages: preparing for the experiment, followed by the experimenting in the classroom stage, and the final stage is conducting

retrospective analysis.

1. Preparing for the experiment

In the initial stage, researchers design learning scenarios based on HLT (Hypothetical Learning Trajectory), which is the assumed thought process of students in achieving learning objectives. The HLT design is incorporated into the Student Worksheet (LKPD) and tested in a small class consisting of six students with varying abilities (two high-ability students, two moderate-ability students, and two low-ability students). The activity design developed in this stage aimed to instill the value of Islamic Brotherhood within the context of mathematics learning, particularly through group prayer activities and the introduction of angle concepts.

2. Conducting the experiment in the classroom.

The HLT that was developed was then tested in the classroom, resulting in the ALT (Actual Learning Trajectory), which represents the actual learning process that occurred. From this, the researcher can identify which parts are effective and which need improvement. Based on these results, the researcher develops HLT 2 as an improvement over the previous activity. If necessary, this development continues to HLT 3, so the design process proceeds cyclically. Each cycle reflects adjustments to the dynamics of learning taking place in the classroom.

3. Conducting retrospective analysis.

In the final stage, researchers analyze the entire learning process and compare the results obtained with the initial plan in HLT. This analysis aims to evaluate whether the learning objectives, including the formation of Ukhuwah Islamiyah values, have been achieved. The results of these observations form the basis for the development of LIT (Local Instruction Theory), which is a local learning theory derived from research.

RESULTS AND DISCUSSION

Preparing for the experiment

This study began with field observations conducted on November 19, 2024, at SDIT At-Taqwa Surabaya. The purpose of the observation was to understand the school environment, the characteristics of the students, and the implementation of mathematics learning at the school. Prior to implementation, the researcher coordinated with the Vice Principal and received instructions to discuss with Ustadz BM, the mathematics teacher and homeroom teacher of class 5C. During the

observation, the researcher also conducted structured interviews to gather information about the implementation of realistic mathematics learning and the value of Ukhuwah Islamiyah in the learning process. After obtaining the initial data, the researcher adjusted the Mathematics Learning Outcomes (CP) Phase C so that the learning design was in line with the conditions in the field. As a basis for developing the Hypothetical Learning Trajectory (HLT), the researcher first developed an iceberg model to map the stages of students' understanding of the concept of angles through the context of foot positions during congregational prayer. These stages include: situational (direct observation), model of (representation of foot positions and angles), model for (application to solve problems), and formal (mathematical abstraction of angle concepts). Based on this iceberg model, the researcher designed five sequential activities and developed a Student Worksheet (SW) validated by an expert mathematics lecturer in Primary Education, Mr. Zaenal Abidin, S.Pd., M.Pd. The research was conducted in two cycles: the first cycle in a small class with six students of varying ability levels (high, medium, low), and the second cycle in a large class to assess the effectiveness of the activities on a broader scale. Data collection techniques included observation, interviews, and documentation.

Experimenting in the classroom

Small-class trial

The class trial involved six students selected based on three ability categories: high, medium, and low. The selection was made purposively, considering the diversity of abilities to ensure the research results reflected a representation of various student levels. These six students were from class 5C and were selected by Ustadz BM, the mathematics teacher and homeroom teacher, given his in-depth understanding of each student's character and academic achievements. The following is a table of participant codes used in this small-scale trial:

Table 1. List of Research Student Codes for Small-Scale Trial.

No.	Student Codes	Ability Category
1.	AJ	High
2.	JH	
3.	AV	Medium
4.	AN	
5.	AF	Low
6.	NZ	

The trial in the small class was conducted using HLT 1, which had been prepared beforehand. This HLT included the researcher's identity, learning outcomes and objectives, five activities with descriptions, math goals, and conjectures for each activity. The five activities included: observing pictures, conducting simulations, making models, drawing and measuring angles, and classifying types of angles. During the implementation, the researcher conducted observations, took notes, and documented the process with photos and videos as research data sources. The collected data was analyzed to see the correspondence between the conjectures in the HLT and the reality in the classroom, as well as to identify the possibility of new responses or learning patterns. The results of this analysis were formulated into the ALT (Actual Learning Trajectory), which serves as the basis for revising the HLT before it is applied in a large-scale classroom trial. The ALT provides a concrete comparison between the initial assumptions in the HLT and the actual learning process in the field.

Large-Class Trial

The large-class trial involved 22 fifth-grade students from class A. The learning activities were carried out in groups to encourage interaction, discussion, and collaboration among students. Five groups were formed, each consisting of 3 to 5 members. The male students were divided into two teams: Abu Bakar Ash-Shiddiq and Umar bin Khattab, while the female students were divided into three teams: Khadijah binti Khuwailid, Aisyah binti Abu Bakar, and Hafsa binti Umar. The naming of these groups aimed to instill Islamic role model values early in the learning process.

Technically, the implementation of the large-class trial adapted the same activities as those used in the small-class trial. All learning activities referred to the previously designed Student Worksheets (LKPD). This trial represented the implementation of HLT 2, a revised version of HLT 1 based on the findings and evaluations from the previous stage. While the structure of the activities remained unchanged, adjustments were made to the conjectures to align students' predicted thinking with actual classroom responses.

The five core activities in HLT 2 included: (1) observing images of foot positions in congregational prayer, (2) simulating congregational prayer, (3) creating models of foot positions, (4) drawing and measuring the angles formed, and (5) classifying the types of angles based on the created models. The implementation resulted in ALT 2 (Actual Learning Trajectory), which reflected the actual learning process in the classroom and served as a benchmark against the conjectures proposed in HLT 2.

Conducting Retrospective Analysis

The following is an analysis of the principle of Ukhuwah Islamiyah based on the learning activities that were carried out, which include:

1. Ta'aruf (Getting to Know One Another)

In the implemented activities, students were divided into several groups and given the opportunity to discuss and interact. Initially, some students appeared awkward and unfamiliar with one another. This was reflected in statements such as:

Student A : "I usually don't work in a group with him, sir."

However, as the activity progressed, students began to open up and interact more naturally. For example:

Student A : "Hey, how come their group got an acute angle? Let's double-check ours!"

Student B : "How did they do it? Try to explain!"

Interactions also reflected growing awareness of each other's personalities and communication styles. Some students showed patience in dealing with peers who were less or overly active.

Researcher : "Why isn't he helping you?"

Student : "He's always like that. He doesn't like counting."

In another conversation:

Researcher : "Who can translate this?"

Student B : "Student A, sir. He's smart and has a loud voice."

These observations show that students began to truly get to know their groupmates and understand each other's working styles and individual traits.

2. Tafahum (Mutual Understanding)

The principle of tafahum was clearly visible during the simulation of congregational prayer, especially when students aligned their feet to form straight and close rows (shaf). In one case, a student stood with feet too far apart, causing a gap in the row. A peer beside them whispered:

Student A : "Hey, move a little closer so the line looks neat."

Student B : "Oh okay, got it."

The student responded with a smile and corrected their position. There were also moments

when students adjusted themselves automatically through simple hand signals or nods, showing mutual understanding without needing to speak.

3. Ta'awun (Helping One Another)

After progressing through ta'aruf and tafahum, students naturally demonstrated the value of ta'awun, or helping each other in goodness. This was apparent in the group activity where students created prayer row models and illustrated foot angles. Each member contributed based on their strengths:

Researcher : "Why is he the only one working?"

Student : "Because he's good at drawing, Kak."

Researcher : "What's your role?"

Student A : "I'm doing the measurements, sir."

Student B : "Yes, because he's smart at math."

This showed that students respected each other's abilities and divided tasks accordingly some drawing due to visual skill, some measuring due to numerical ability, and others organizing reports due to writing skills. Without realizing it, they had applied ta'awun throughout the learning process.

4. Takaful (Solidarity)

After ta'aruf, tafahum, and ta'awun, students began to exhibit takaful a sense of solidarity and mutual support. This value was observed throughout the learning activities. Since the learning context was based on congregational prayer, a reflection session was held at the end of the lesson to explore the students' understanding of Ukhuwah Islamiyah.

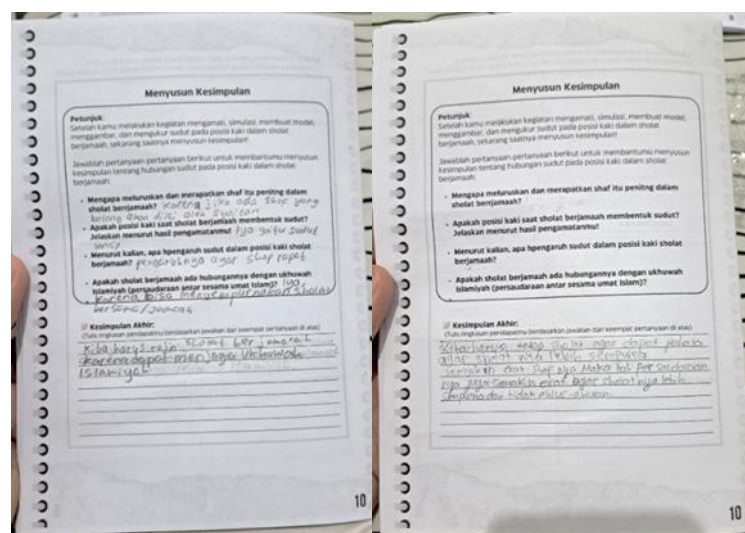


Figure 1. Group work results of Khadijah binti Khuwailid and Aisyah binti Abu

Bakar groups

Researcher : “Do you think there is any element of ukhuwah in congregational prayer?”

Student A : “Yes, Sir. In group prayer, we remind each other to close the gaps in the row.”

Student B : “Yes, because it teaches us to be considerate. Normally when we pray, we just think of ourselves and ignore those next to us.”

Student C : “That’s right, sir. When the row is close and neat, the prayer feels united and perfect.”

These responses indicate that students experienced takaful during the learning process. They were able to reflect on how congregational prayer embodies Islamic brotherhood values. Thus, takaful in this context was not just theoretical it was truly internalized through authentic classroom interactions and learning experiences.

The findings of this study indicate that integrating mathematics learning with Islamic-based activities, such as the simulation of congregational prayer, can effectively cultivate the principles of Ukhuwah Islamiyah among students. This aligns with the concept put forward by [Suriati, et al \(2020\)](#) in their work titled "Da'wah in Form of Ukhuwah Islamiyah," which outlines four main principles: ta'aruf (mutual acquaintance), tafahum (mutual understanding), ta'awun (mutual assistance), and takaful (solidarity). These principles are a synthesis of various scholarly guidelines derived from the Qur'an and Hadith, intended to help Muslims strengthen Islamic brotherhood.

First, ta'aruf refers to the process of getting to know each other physically (jasadiyyah), intellectually (fikriyyah), and emotionally (nafsiyyah). This was clearly observed when students who were initially unfamiliar with one another began to recognize each other's speech patterns, personalities, and habits through group interactions. The student dialogues reflected this acquaintance process not only in physical terms but also in how they understood one another's thinking and character. Furthermore, the principle of tafahum emerged as students began to consciously adjust to one another, for example by straightening prayer rows using subtle cues or body language without verbal communication. Mutual understanding is key to achieving ukhuwah. Following this phase, the value of ta'awun or cooperation surfaced, seen in how students divided roles within their group. Each member contributed according to their strengths—some were responsible for drawing, others for measuring, and others for compiling reports. This division of

labor demonstrated mutual support and collaboration in completing the worksheet tasks. Eventually, the learning activities fostered takaful, the highest level of solidarity in Ukhuwah Islamiyah, evident in students' shared reflections on the meaning of brotherhood in congregational prayer. They not only grasped the importance of standing in straight, tight rows but also understood the deeper significance of empathy and unity in worship. As described in the teachings of the Prophet's companions, takaful means standing together in both joy and hardship, and prioritizing others' needs over one's own. Therefore, it can be concluded that the four principles of Ukhuwah Islamiyah were successfully nurtured through the designed learning activities.

CONCLUSION

In this study, the researcher selected the concept of angles within the context of congregational prayer to be developed into a learning activity design. The activities were structured following the Hypothetical Learning Trajectory (HLT) and consisted of five stages: (1) observing images of foot positions in congregational prayer, (2) simulating congregational prayer with foot positions forming angles, (3) creating a model of foot positions that form angles, (4) drawing and measuring the angles formed, and (5) classifying the types of angles based on the foot positions during congregational prayer. These activities were adapted from previous studies with similar concepts and had been successfully implemented. The learning process also supported the four key principles of Ukhuwah Islamiyah. Ta'aruf (mutual acquaintance) was observed when students not only became familiar with each other's physical presence but also with their personalities and ways of thinking. Tafahum (mutual understanding) was reflected in how students consciously adjusted to one another. Ta'awun (mutual assistance) was seen in how students divided roles to complete the worksheets based on their individual strengths. Finally, Takaful (mutual care and responsibility) was evident in the solidarity and collective reflection of students on the meaning of togetherness during congregational prayer. These results imply that integrating religious values into mathematics learning can serve as a powerful medium for character education. For educators, this approach offers a culturally relevant and spiritually meaningful method to engage students. Future research is encouraged to explore similar integrations across other mathematical topics and educational levels to further promote holistic student development..

REFERENCES

- Amin H.A, Muh. Amirul, Muammar Mukhtar, dan Masri S. 2024. "Aktualisasi Ukhuwah Insaniyyah dalam Bermoderat (Studi Tafsir Tahlili) Tafsir Al-Misbah." *MAPPADECENG: JURNAL MULTIDISIPLIN* 1(1).
- Anggreni, Fenny. 2019. "Relevansi Pembelajaran Matematika Dengan Nilai-Nilai Al-Qur'an Dalam Membentuk Karakter Siswa Pada Materi Pecahan." *Jurnal Ilmiah Pendidikan Matematika Al Qalasadi* 3(1):10–18. doi:10.32505/qalasadi.v3i1.896.
- Gravemeijer, Koeno. 1994. *Developing Realistic Mathematics Education*. Utrecht: Freudenthal institute.
- Gravemeijer, Koeno, dan Paul Cobb, ed. 2006. *Educational Design Research*. London New York: Routledge, Taylor & Francis Group.
- Hasibuan, Vira Amelia Pratiwi, Neni Mariana, dan Rooselyna Ekawati. 2024. "Literature Study: Elementary School Mathematics Learning with Islamic Integration." *International Journal of Emerging Research and Review* 2(2):000071. doi:10.56707/ijer.v2i2.71.

- Sunan Abi Dawud. Sunnah.com. <https://sunnah.com/muslim>
- Sahih al-Bukhari. Sunnah.com. <https://sunnah.com/muslim>
- Sahih Muslim. Sunnah.com. <https://sunnah.com/muslim>
- Majid, Annis Annafik, dan Neni Mariana. 2024. "Desain Pembelajaran Matematika Realistik Terintegrasi Gerakan Sholat Pada Materi Pengukuran Sudut Kelas 5 Sekolah Dasar." 12(4).
- Permatasari, Siti Radiah, Desty Septianawati, dan Rahman Haryadi. 2023. "Pengembangan Video Pembelajaran Bermuatan Karakter Terintegrasi Ayat-Ayat Al Qur'an Pada Materi Aritmatika Sosial." *Laplace: Jurnal Pendidikan Matematika* 6(1):136–47. doi:10.31537/laplace.v6i1.1111.
- Primasari, Ika Firma Ningsih Dian, Zulela Zulela, dan Fahrurrozi Fahrurrozi. 2021. "Model Mathematics Realistic Education (Rme) Pada Materi Pecahan Di Sekolah Dasar." *Jurnal Basicedu* 5(4):1888–99. doi:10.31004/basicedu.v5i4.1115.
- Ramadhanty, Afifach, Qori Nurlaeli, dan Sri Utami. 2024. "Pendekatan Pendidikan Matematika Realistik dalam Pembelajaran Matematika." *JURIHUM: Jurnal Inovasi dan Humaniora* 1.
- Safitri, Nurul Ulfa, dan Syamsu Arlis. 2023. "Pengaruh Pendekatan Pendidikan Matematika Realistik Indonesia Terhadap Hasil Belajar FPB KPK Kelas IV SD." *e-Jurnal Inovasi Pembelajaran Sekolah Dasar* 10(2):42. doi:10.24036/e-jipsd.v10i2.10400.
- Sopiyah, Siti, Laura Anisah Prihatini, dan Noval Tri Zaenal Muttaqin. 2023. "Nilai Ukhuwah Islamiah; Metode Penguatan Nilai Afektif dalam Pendidikan Islam Urgensi Sarah Hadits Arbai'n ke 35 An-Nawawi." 9(1).
- Suriati, Burhanuddin, dan Makmur Jaya Nur. 2020. "Da'wah in Form of Ukhuwah Islamiyah." dalam *Proceedings of the 1st Borobudur International Symposium on Humanities, Economics and Social Sciences (BIS-HESS 2019)*. Magelang, Indonesia: Atlantis Press.
- Van den Akker, Jan, Brenda Bannan, Anthony E. Kelly, Tjeerd Plomp, Nienke Nieveen, Koeno Gravemeijer, Paul Cobb, dan Elvira Folmer. 2013. *Educational Design Research*. Rev. ed. Enschede Netherlands: Netherlands Institute for Curriculum Development.